

INKJET MEDIA: By Keith Shipton

For Keeps

SOME INKJET PAPER AND INKS NOW PRODUCE LONGER-LASTING IMAGES THAN CONVENTIONAL PHOTOGRAPHIC PAPER . . .

. . . BUT IT'S CERTAINLY NOT TRUE OF EVERY COMBINATION.

As recently as five years ago, many people in the photographic industry regarded the following two claims as hard fact:

1. Digital cameras would never (affordably) match the quality of film
2. Images printed by inkjet technology would never match the quality of pictures printed on photographic paper, and would always be prone to rapid deterioration.

. . . Which just goes to show how fast digital photography has progressed. While the film Vs digital camera quality issue deserves an article on its own, the overall quality, and particularly the keeping characteristics of inkjet prints, is a more pressing concern.

There are a lot of marketing claims being made by the various vendors. 'Better than photo quality' claims Canon of its photo inkjet printers. 'Lasts for 100 years' claims Kodak of its inkjet paper. Sorting the facts from the hype is a devil of a job – and the devil, as they say, is in the detail!

There are no ISO or ANSI standards for inkjet printers, papers and inks, which has created an environment where marketers can put the best possible gloss on the performance of their particular product.

A topical analogy is fuel consumption figures for motor vehicles. There are standardized tests to measure litres used per 100 kilometres that all manufacturers adhere to, so buyers are able to make fair comparisons on consumption data. If every car manufacturer were allowed to conduct its own tests, the world fuel crisis would (on paper at least) be solved overnight. V8 4WDs would miraculously start running on the smell of the proverbial oil rag!

The Wilhelm Imaging Research Inc (WIR), founded by Henry Wilhelm and Carol Brower Wilhelm, was initially established in the 1980s to conduct research on the stability and preservation of traditional colour photographs and motion picture film. Henry Wilhelm had been researching photographic image preservation for two decades prior to the establishment of WIR.

Until their ground-breaking research showed otherwise, the general assumption was that colour photographs had similar keeping qualities to black and white, when in fact some colour papers, Wilhelm proved, deteriorated in just months when exposed to moderate levels of ambient light.

In 1993 they published an exhaustive 744-page book, *The Permanence and Care of Color Photographs*. The findings in this book ranked Fuji colour paper in particular as far superior to its US competitor in terms of image life. This put Wilhelm forever offside with Kodak. But that's another story from another era.

Now Henry Wilhelm has moved on to new media, particularly inkjet.

The Wilhelm Research Institute has become the de facto international authority for testing inkjet and dye-sub systems in the

absence of accepted international standards. It is accepted by all the major players except for Kodak.

The issue this time is Kodak's Ultima photo quality inkjet paper. Kodak conducts accelerated light stability tests using an illumination level of 120 Lux (UV filtered) over 12 hours per day. The Wilhelm Institute, and the rest of the inkjet industry, used a standard of 450 – 500 Lux and 12 hours a day.

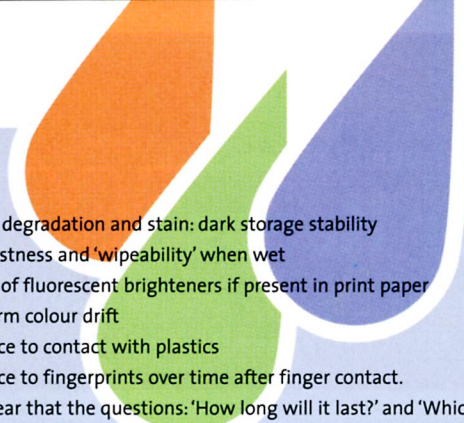
It's fairly clear from Wilhelm's research, the advice he shares at international seminars and conferences – and sheer commonsense – that the best lifespan results are achieved when printer, ink and paper all come from the same manufacturer

Using its lower light measure, Kodak is able to claim that its paper will hold an inkjet image – *from any current generation inkjet printer and ink combination* - for 100 years. Wilhelm counters by claiming that if this measure was applied to Epson Picture Mate prints, they would have a life between 500 and 800 years; 1000 years for a print from an Epson Pro 4000 on its best paper!

Kodak says 120 Lux is a more realistic light measure for home display environments, and that 450 Lux is closer to commercial office lighting. Opponents of the Kodak position say it would be difficult to even see a print properly in 120 Lux, and that 40 percent of prints are displayed unframed on the household refrigerator, where light levels tend to be quite high.

The following statement appears on the Ultima packaging and in press releases: 'Longest lasting inkjet photo paper under typical home display conditions. Lasts over 100 years when using latest inks, even when displayed without protection behind glass'.

'The Kodak test method provides "years of



display" predictions that typically range from four to eight times longer than test methods used by WIR, HP, Canon, Fuji and most other companies,' Henry Wilhelm told the Japan Hardcopy conference earlier this year.

Kodak is in a difficult position in the inkjet market. While the company just about wrote the book on how best to put multiple, micron-thin layers onto paper base, it doesn't manufacture consumer inkjet printers or inks. (Its Encad subsidiary manufactures commercial wide-format printers and inks). Yet it's fairly clear from Wilhelm's research, the advice he shares at international seminars and conferences—and sheer commonsense – that the best lifespan results are achieved when printer, ink and paper all come from the same manufacturer: They are 'made for each other'. He uses as an example a WIR test on an HP ink/media combination. Used together, the resulting prints had a life of 73 years. When third-party ink was used, that lifespan fell to just two years!

The marketing challenge for Kodak and the growing number of 'third party' inkjet paper suppliers who do not manufacture printers and ink, is to convince consumers that a 'one size fits all' paper – even a premium one like Ultima – is a good product for producing long-lasting, high quality hard copy at home.

Kodak will point out that Wilhelm is not infallible and has been wrong before. Indeed, in an early test on Epson inkjet papers, his predictions of a 10-year life were woefully off the mark, with prints deteriorating in just a few months. At that stage no one was aware of other environmental affects that impact specifically on inkjet media but not silver halide, in this case the urban pollutant, ozone.

WIR now has a more sophisticated understanding of the peculiarities of inkjet, and has 'image-quality-loss metrics' for a range of variables besides light and ozone:

- Resistance to surface abrasion
- Humidity fastness: colour change and/or loss of sharpness (Wilhelm reckons Kodak squibs on this measure, too)

- Thermal degradation and stain: dark storage stability
- Water fastness and 'wipeability' when wet
- Stability of fluorescent brighteners if present in print paper
- Short-term colour drift
- Resistance to contact with plastics
- Resistance to fingerprints over time after finger contact.

So it's clear that the questions: 'How long will it last?' and 'Which one should I buy?' are by no means clear-cut, and not likely to get any clearer in the immediate future.

Currently, consumers are walking into Big W or Harvey Norman, gazing perplexed at the expanding range of papers and inks, at and being bamboozled by the leap-frogging claims of everlastingness on the packaging.

A regular visit to the WIR website is probably a mandatory first step in keeping abreast of the technology as new products are constantly being released and tested. For the truly dedicated, Wilhelm even has his massive and updated classic, *The Permanence and Care of Color Photographs*, available as a free download.

For those of us who assume silver halide is for keeps and the newer technology has a lot of catching up to do, perhaps the most startling rating made by WIR is that the longest lasting of all combinations used to produce 4x6-inch prints is (drum roll) the new pigment-based Epson PictureMate Personal Photo Lab, with a permanence rating of 104 years.

Next comes the new HP Photosmart 325/375 Compact Photo Printers (82 years). A long way back at 40 years comes the silver halide Fujicolor Crystal Archive Type One Paper and Fuji Frontier minilab combination, followed by the Kodak EasyShare Printer Dock 400 and 6000 (dye-sub, 26 years). This nudges its sibling silver halide technology, Kodak Ektacolor Edge, into fifth place with a WIR rating of just 19 years.

To its credit, Kodak's dye-sub technology is way out in front of others in the field. Prints from Sony's dye-sub photo printer has a WIR permanence rating of just 4 years. ■

Here are a few 'items of interest' gleaned from the Wilhelm site and other sources while preparing this article:

- Instant dry 'microporous' high gloss papers are particularly prone to the effects of atmospheric pollution in combination with (ubiquitous) dye-based inks. If you rub your finger across the paper and it grabs or squeaks it's probably a porous paper. There are some other glossy papers that are 'swellable' – they take far longer to dry but provide a greater amount of protection from atmospheric gases. (But on the other hand are not as water-resistant.) Be wary of recommending paper that promotes itself as 'instant dry' unless you are sure it's not a porous variety.
- While the use of pigment inks with microporous glossy papers is satisfactory in terms of image permanence, they can exhibit a variable glossiness over the surface – a function of the density of the ink.

- Fingerprints are no more a permanence issue for inkjet prints than traditional photographic prints.
- Pigment-based inks are superior in terms of permanence to dye-based inks, but most have a poorer colour gamut and lower saturation. The exception is Epson's new(ish) UltraChrome inkset.
- Dye-based inks are particularly susceptible to 'short term colour drift' in high humidity environments. The colours will change over weeks or months.
- Six- and seven-colour systems have tended to be less stable than four-colour, but the latest six-ink system used in HP PhotoSmart printers is actually more stable than the HP's four-ink system. New six/seven-ink printers developed specifically for photographic printing are likely to overcome the failings of earlier inks as image life becomes a crucial design criterion.
- Especially with dye-based printers, choice

of paper has probably the largest impact on permanence. Wilhelm considers HP's latest photo inks and Premium Plus Photo Paper the best dye-based combination going round at the moment.

- Third-party papers that are advertised as being suitable for all printers are almost by definition, according to Wilhelm, not optimised for any particular inkset or printer.
- Most manufacturers of third party inks and papers pay scant attention to image permanence issues
- Brilliant white papers use brighteners that fluoresce blue and absorb harmful UV radiation – a paper with less brightener will have a longer life.
- 'Mixing and matching' papers and inks is far more risky with dye-based inks than pigment-based inks.
- The 'Big Three' in printer technology, HP, Epson and Canon, are the most advanced in the field of image permanence.

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